The Rambling Engineer

By Howard H. Heffley

Radio "Course Indicators"

Westinghouse Electric and Manufacturing Company engineers have invented a new radio course finder. This device is located on the instrument panel of an airplane where the pilot may watch it and it thereby removes the necessity of his having to listen to beacon tone signals. An indicator in the form of a meter, which is somewhat similar to that of an ammeter on an automobile, registers the position of the plane with respect to the beacon. The needle of this device, which normally rests in the center of its scale, deviates to the right or left as the plane drifts from its proper course.

The complete device is boxed in a container about eighteen inches long, and consists of a single tuned radio frequency receiver. A specially developed vibrating reed filter permits the operator to listen to weather reports without interfering with the action of the course indicator needle. Signals picked up from the beacon station by means of this receiver are a mixture of weather reports and low frequency course indication signals. The apparatus is so arranged that these signals are separated allowing the pilot to see one and hear the other.

Due to the visual method of course indication the pilot now does not have to listen to a monotonous tone during his flight, but is enabled to observe the course occasionally on the meter on the dash board. Another interesting feature possible with this new system is that instead of flying exactly along the beacon and then turning at the proper point to arrive at a destination, the pilot now can adjust his equipment to any desired angle of flight with the main beam of the beacon station.

Naval Power Reduction

It was my privilege during the holidays to look through a file of that most elaborate magazine, Fortune. Several articles particularly attracted my attention, but perhaps for both personal and practical reasons I was interested in an article "10,000 Tons of Fighting Cat," written by Commander Edward Ellsberg.

We find here discussed the naval reduction program both from an engineering standpoint and from the standpoint of the economist. However, we might look at this measure through the eyes of the average taxpayer. Undoubtedly he was glad to hear of such a program because common sense seemed to indicate to him that small ships meant less money needed for that branch of the national defense. But instead of costing less, the average cost per ton rose from about $640 to $1400. The reason for this might be clearly understood by explaining the conditions existing in the naval construction departments and to some extent the changes necessary in building the new 10,000-ton ships.

When the limitation on naval programs was announced, as Commander Ellsberg explained, the sea-going naval officers and civilian technicians were working over their drawing boards and ballistic tables struggling with the problem of increasing the range of sixteen-inch guns. In the Bureau of Construction and Repair, the problem of hull strength was a pressing question as the foremost naval constructors were busy designing vast hulls which would withstand the terrific shock of twelve sixteen-inch guns fired in one salvo, and also in turn would resist a similar salvo of enemy fire. This all meant large, heavy construction, quite contrary to the disarmament limits. And finally in the design section of the Bureau of Engineering, that message wrote "finis" across the half-completed tracings of the Navy's best engineers, who were still wrestling with the problem of how to provide the gigantic turbo-electric drives and the necessary boiler power to get a thirty-five-knot speed out of 45,000-ton battle cruisers. In fact the word reduction spelled doom to the seven largest battle ships and four largest battle cruisers, the world was ever to have seen, that were being constructed.

All these drastic changes demanded new ideas in equipment and supplies furnished by individual companies. The U. S. Steel Corporation's engineers were confronted with the problem of supplying steel for the new light members; Bethlehem and Midvale busied themselves with their specialty,—armor plate; something new and something different was expected of the Babcock & Wilcox Co. in the line of boilers and from the Crane Co., in valves. Some of the other manufacturers are as follows: Worthington Pump & Machine Corp. and De Laval Steam Turbine Co., pumps; Sperry Gyroscope Co., navigational instruments; International Nickel Co., alloy steels; Aluminum Co. of America, aluminum for plates and for paint; Chance-Vought Corp., airplanes; Du Pont, powder, more paint, and specialties; Ford Instrument Co. of New York, fire control instruments.

In the construction of these new cruisers, power, speed and strength must be crowded into the last inch of space in order to make them efficient and effective. The strength of the hull of the ship to withstand and break up enemy fire is a very important feature and in past designs the practice was to use heavy construction around vital parts, but today the limit of weight completely makes this idea void, and from present designs it is apparent that speed is the important factor in place of massive structure for the self-protection of a ship.

The advance in cost per ton in the construction of these ships will probably be justified in a few years, for if the past designs were to be carried on the total amount expended for naval defense would undoubtedly mount to quite a higher figure than for the present program, especially with the unceasing tendency to outdo other countries of the world in this form of defense.